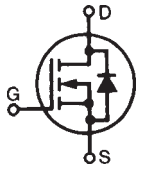
IXYS

# Linear™ Power MOSFET w/Extended FBSOA

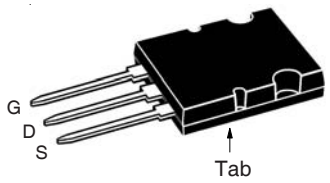
# IXTB62N50L

$V_{DSS}$ = 500V
$I_{D25}$ = 62A
$R_{DS(on)}$ ≤ 100mΩ




N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode

**PLUS264™**




G = Gate D = Drain
S = Source Tab = Drain

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | 500 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C, $R_{GS}$ = 1MΩ | 500 | V |
| $V_{GSS}$ | Continuous | ± 30 | V |
| $V_{GSM}$ | Transient | ± 40 | V |
| $I_{D25}$ | $T_C$ = 25°C | 62 | A |
| $I_{DM}$ | $T_C$ = 25°C, Pulse Width Limited by $T_{JM}$ | 150 | A |
| $I_A$ | $T_C$ = 25°C | 80 | A |
| $E_{AS}$ | $T_C$ = 25°C | 5 | J |
| $P_D$ | $T_C$ = 25°C | 800 | W |
| $T_J$ | | -55 ... +150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{stg}$ | | -55 ... +150 | °C |
| $T_L$ | 1.6mm (0.062 in.) from Case for 10s | 300 | °C |
| $T_{SOLD}$ | Plastic Body for 10s | 260 | °C |
| $F_C$ | Mounting Force | 30..120/6.7..27 | N/lb. |
| **Weight** | | 10 | g |

### Features

- Fast Intrinsic Diode
- Avalanche Rated
- Low $R_{DS(ON)}$ and $Q_G$
- Low Package Inductance

### Advantages

- High Power Density
- Easy to Mount
- Space Savings

### Applications

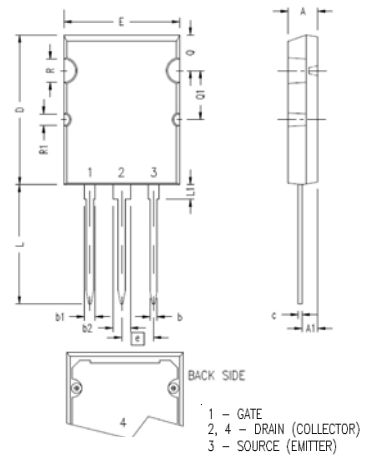
- Programmable Loads
- DC-DC Converters
- Current Regulators
- Battery Chargers
- DC Choppers
- Temperature and Lighting Controls

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 1mA | 500 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = 250μA | 3.0 | | 5.5 | V |
| $I_{GSS}$ | $V_{GS}$ = ± 30V, $V_{DS}$ = 0V | | | ± 200 | nA |
| $I_{DSS}$ | $V_{DS} = V_{DSS}$, $V_{GS}$ = 0V | | | 50 | μA |
| | $T_J$ = 125°C | | | 1 | mA |
| $R_{DS(on)}$ | $V_{GS}$ = 20V, $I_D = 0.5 \bullet I_{D25}$, Note 1 | | | 100 | mΩ |

© 2011 IXYS CORPORATION, All Rights Reserved

| Symbol | Test Conditions ($T_J$ = 25°C Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$ = 10V, $I_D$ = 0.5 • $I_{D25}$, Note 1 | 10 | 15 | 20 | S |
| $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | | 11.5 | | nF |
| $C_{oss}$ | | | 1460 | | pF |
| $C_{rss}$ | | | 210 | | pF |
| $t_{d(on)}$ | **Resistive Switching Times** | | 36 | | ns |
| $t_r$ | $V_{GS}$ = 15V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 0.5 • $I_{D25}$ | | 85 | | ns |
| $t_{d(off)}$ | $R_G$ = 2Ω (External) | | 110 | | ns |
| $t_f$ | | | 75 | | ns |
| $Q_{g(on)}$ | $V_{GS}$ = 20V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 0.5 • $I_{D25}$ | | 550 | | nC |
| $Q_{gs}$ | | | 115 | | nC |
| $Q_{gd}$ | | | 180 | | nC |
| $R_{thJC}$ | | | | 0.156 | °C/W |
| $R_{thCS}$ | | | 0.15 | | °C/W |

**PLUS264™ (IXTB) Outline**




| SYM | INCHES MIN | INCHES MAX | MILLIMETERS MIN | MILLIMETERS MAX |
|---|---|---|---|---|
| A | .185 | .209 | 4.70 | 5.31 |
| A1 | .102 | .118 | 2.59 | 3.00 |
| b | .037 | .055 | 0.94 | 1.40 |
| b1 | .087 | .102 | 2.21 | 2.59 |
| b2 | .110 | .126 | 2.79 | 3.20 |
| c | .017 | .029 | 0.43 | 0.74 |
| D | 1.007 | 1.047 | 25.58 | 26.59 |
| E | .760 | .799 | 19.30 | 20.29 |
| e | .215 BSC | | 5.46 BSC | |
| L | .779 | .842 | 19.79 | 21.39 |
| L1 | .087 | .102 | 2.21 | 2.59 |
| Q | .240 | .256 | 6.10 | 6.50 |
| Q1 | .330 | .346 | 8.38 | 8.79 |
| ØR | .155 | .187 | 3.94 | 4.75 |
| ØR1 | .085 | .093 | 2.16 | 2.36 |

**Safe Operating Area Specification**

| Symbol | Test Conditions | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| **SOA** | $V_{DS}$ = 400V, $I_D$ = 750mA, $T_C$ = 90°C | 300 | | | W |

**Source-Drain Diode**

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0V | | | 62 | A |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$ | | | 176 | A |
| $V_{SD}$ | $I_F$ = $I_S$, $V_{GS}$ = 0V, Note 1 | | | 1.5 | V |
| $t_{rr}$ | $I_F$ = $I_S$, $V_{GS}$ = 0V<br>-di/dt = 100A/μs, $V_R$ = 100V | | 500 | | ns |

Note 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or moreof the following U.S. patents: 4,835,592 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

**Fig. 1. Output Characteristics @ $T_J$ = 25ºC**

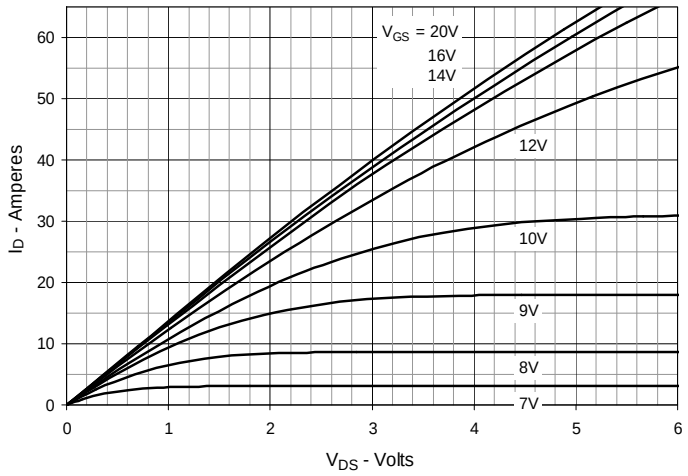



**Fig. 2. Extended Output Characteristics @ $T_J$ = 25ºC**

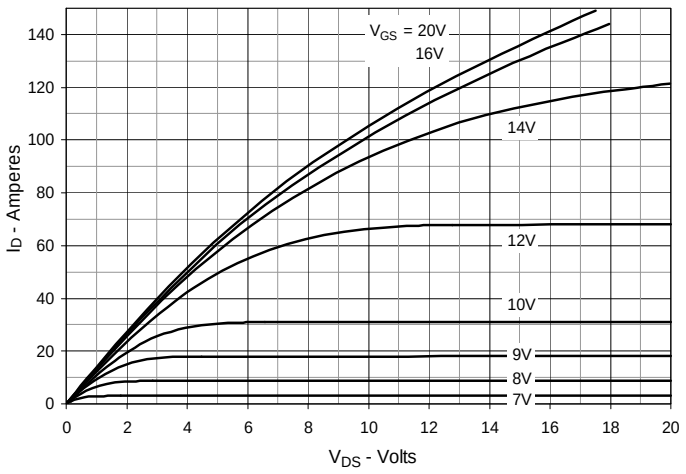



**Fig. 3. Output Characteristics @ $T_J$ = 125ºC**

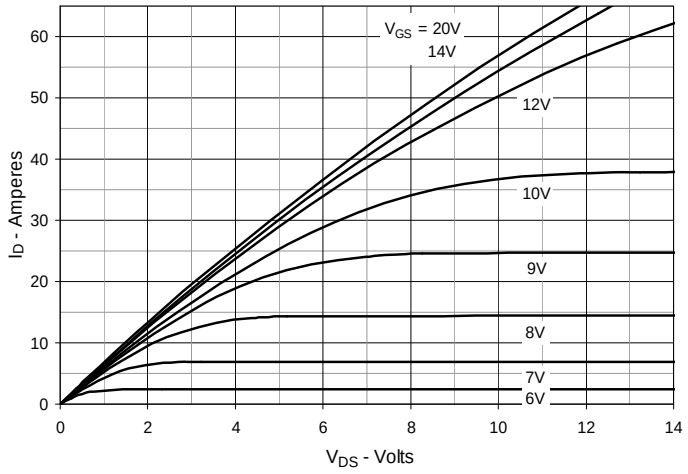



**Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 31A Value vs. Junction Temperature**

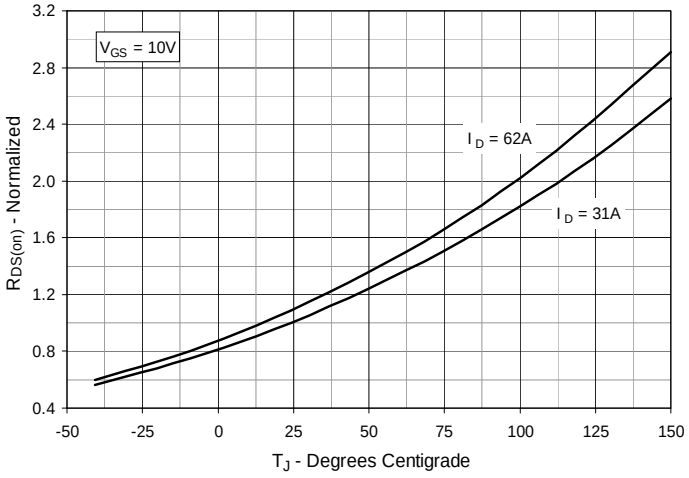



**Fig. 5. $R_{DS(on)}$ Normalized to $I_D$ = 31A Value vs. Drain Current**

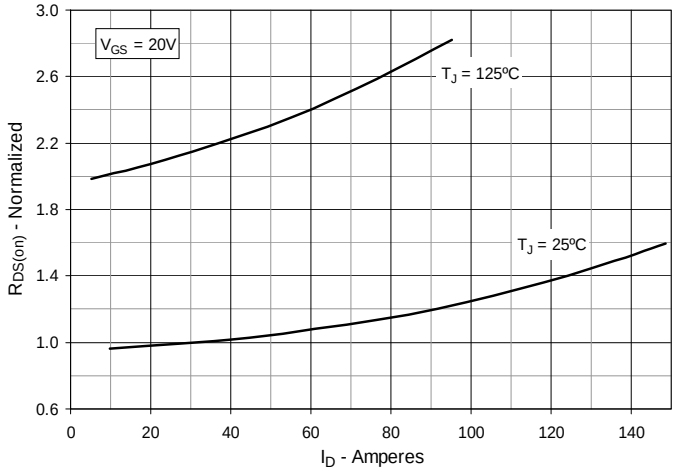
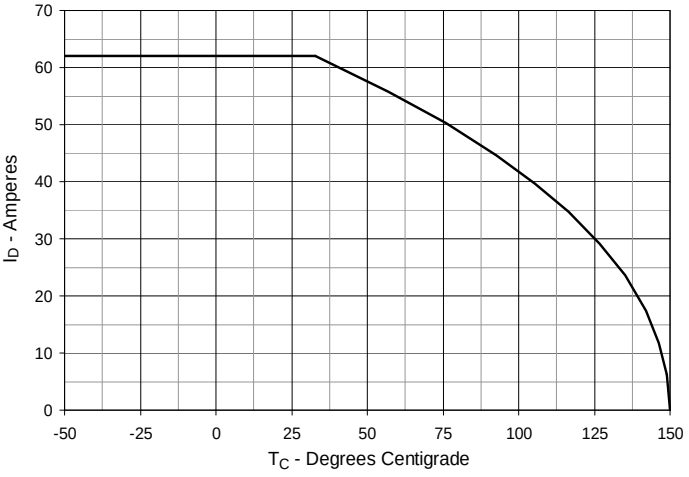



**Fig. 6. Maximum Drain Current vs. Case Temperature**




© 2011 IXYS CORPORATION, All Rights Reserved

**Fig. 7. Input Admittance**

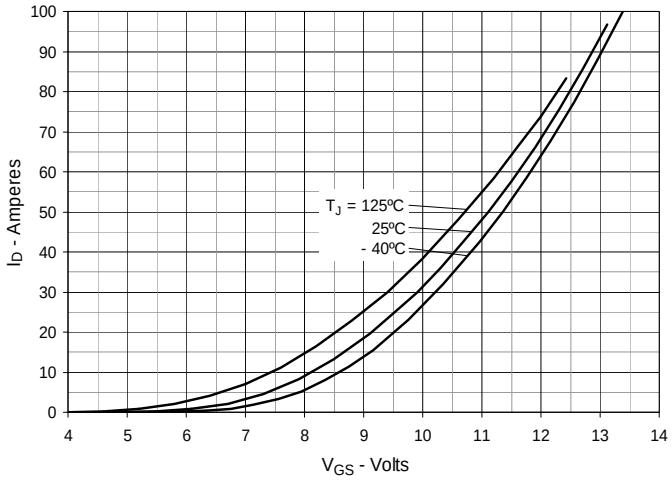



**Fig. 8. Transconductance**

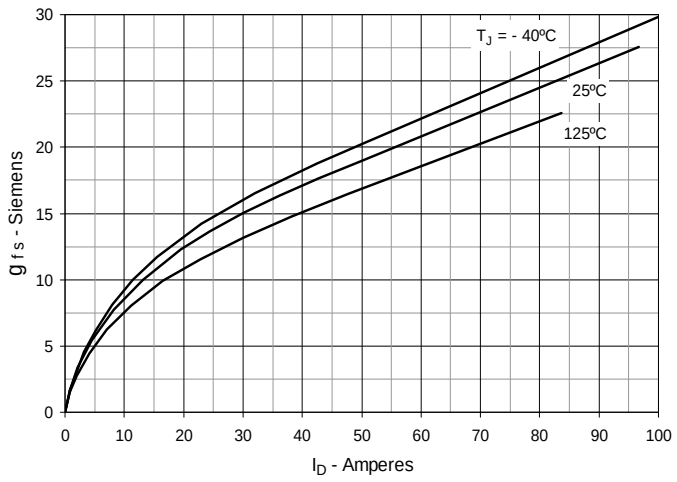



**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

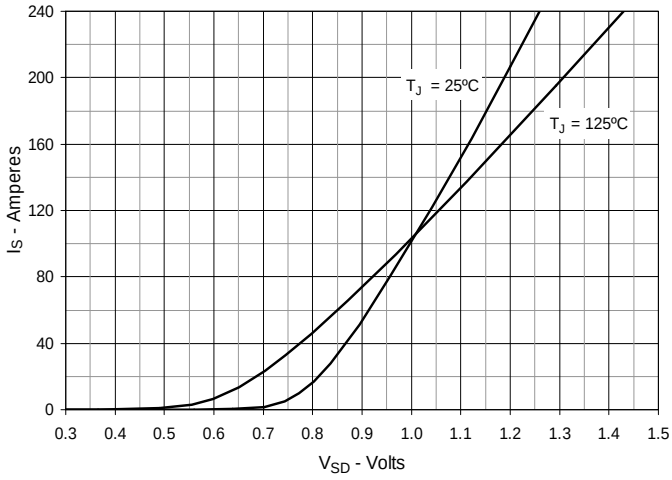



**Fig. 10. Gate Charge**

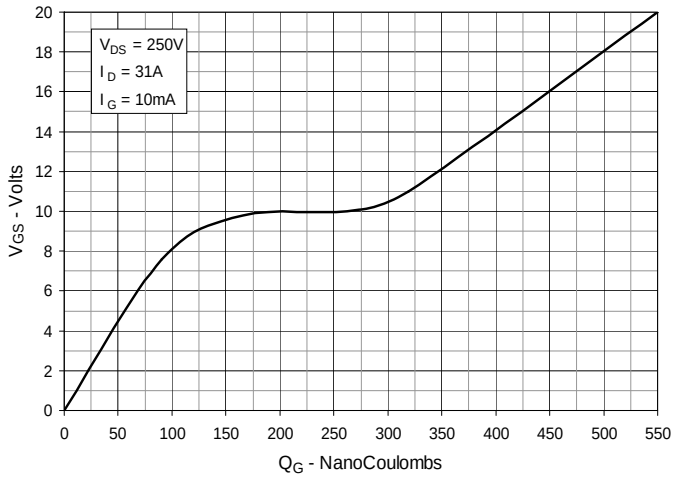



**Fig. 11. Capacitance**

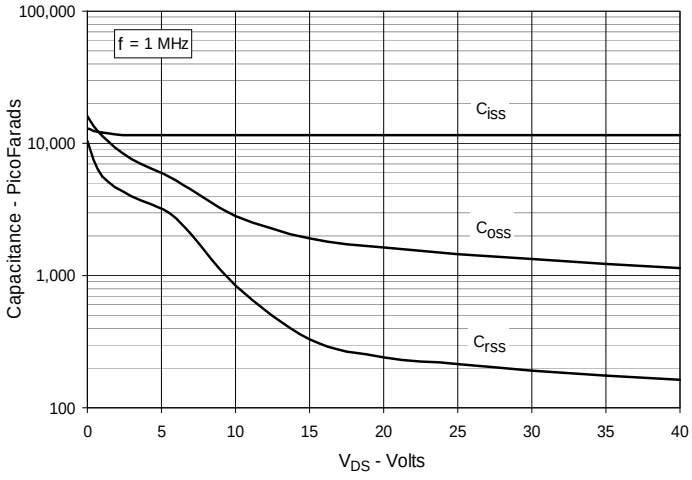
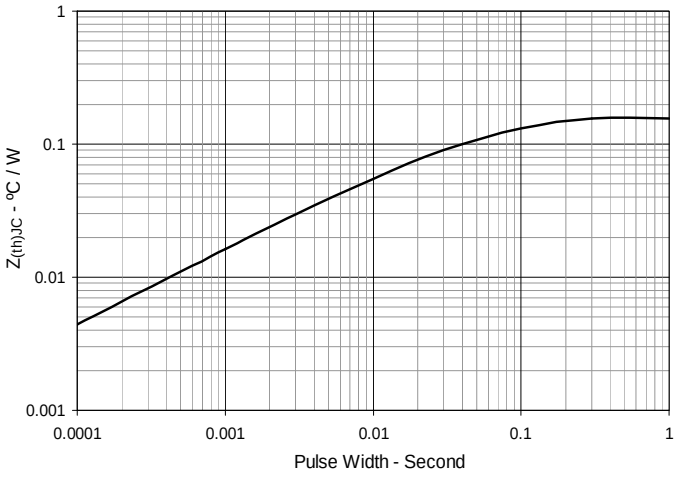



**Fig. 12. Maximum Transient Thermal Impedance**




IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

**Fig. 13. Forward-Bias Safe Operating Area @ $T_C$ = 25ºC**

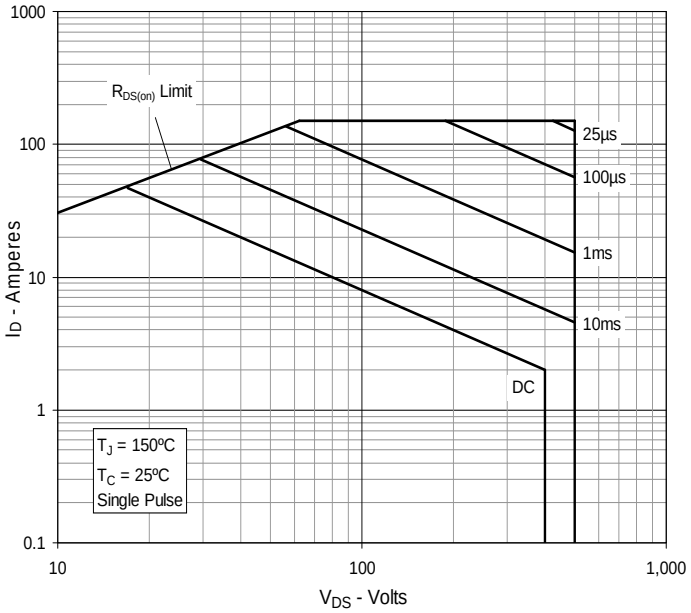
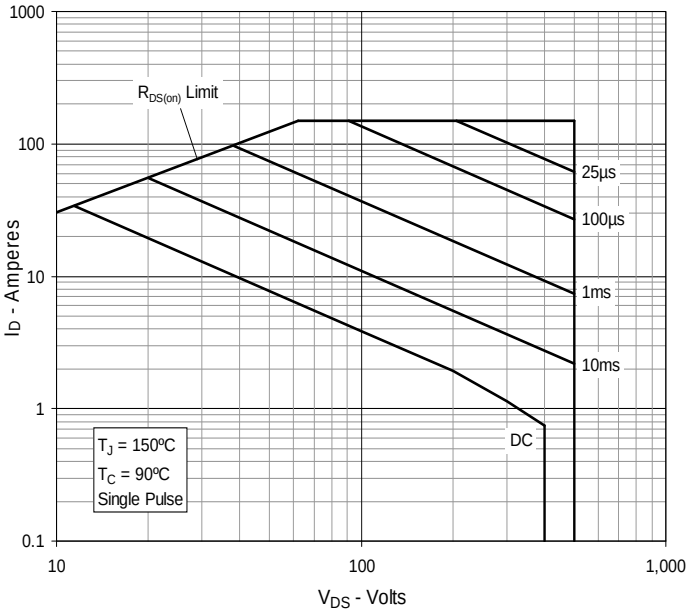



**Fig. 14. Forward-Bias Safe Operating Area @ $T_C$ = 90ºC**




© 2011 IXYS CORPORATION, All Rights Reserved




Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.